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January 20, 2014

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President
Reilly Industries, Inc.
300 North Meridian Street, Suite 1500
Indianapolis, Indiana 46204-1763

Re: United States of America, et al. vs. Reilly Tar & Chemical Corporation, et al.
File No. Civ. 4-80-469
CD-RAP Section 9.2

Gentlemen:

This letter requests approval from the Minnesota Pollution Control Agency and U.S. Environmental Protection Agency (the Agencies) for cessation of pumping at wells W422 and W434. This request is made pursuant to Section 9.2 of the Consent Decree-Remedial Action Plan in the above captioned matter, and the Agencies' December 6, 1999, letter addressing numeric criteria proposed by the City of St. Louis Park (City) on September 28, 1999.

The City's September 28, 1999, letter proposed current Minnesota Department of Health (MDH) health risk limits (HRL) for six specific non-carcinogenic PAH compounds as potential cessation criteria for the wells. In their December 6, 1999, letter, the Agencies agreed that the HRLs were suitable for evaluating cessation, provided that they are used in accordance with MDH guidance. The Agencies stated that cessation criteria should be established using the best available scientific information. The Agencies also required that this cessation request demonstrate compliance with gradient control objectives, provide a plan to assess contaminant spreading after wells are turned off, and establish criteria to be used as action levels to resume pumping, if necessary.

This cessation request is organized into four sections to address each area described above:

1. Numeric criteria provided by the MDH are reviewed and compared to historical water quality results. Additionally, the hypothetical carcinogenic and non-carcinogenic human health drinking water risks are reviewed for all

historical water monitoring results in the Drift, Platteville, and St. Peter Aquifers.

2. Compliance with gradient control objectives is evaluated, based on a hydrogeologic evaluation of the pumping wells and an assessment of the contaminant concentrations and health risks within the capture zones of each pumping well.

3. Assessment of contaminant spreading is addressed through on-going groundwater monitoring in the Drift, Platteville, and St. Peter Aquifers. This section presents a plan for future monitoring.

4. Criteria to resume gradient control pumping are proposed to assure that the overall goals of the project are met.

Numeric Cessation Concentrations: HRLs and Health Based Values, as established by MDH, can provide numeric cessation concentrations. Table 1 lists the HRLs that have been established by the MDH, the MCL for benzo(a)pyrene, and the highest concentration of each of these compounds found in wells W422 and W434 since monitoring began in 1988.

The water quality in wells W422 and W434 is far below the proposed cessation criteria. However, there are three facts that need to be considered for using these numeric concentrations. First and foremost, there are no actual drinking water exposures in the Drift and Platteville Aquifers (and essentially none in the St. Peter Aquifer, although the City still maintains well SLP3 in this aquifer). Therefore, there is no actual human health risks posed by PAH in these aquifers. The PAH concentration data are compared to the HRLs to assess the relative levels of PAH in groundwater over time.

Secondly, the groundwater at the Reilly Site typically contains more than one PAH compound. Therefore, the hypothetical risk based on assuming exposure through drinking water, is the sum of the cumulative risks presented by all of the PAH compounds present in a sample.

Finally, our shared goal of using the best available scientific information presents another complication. Toxicological knowledge has advanced during the past 14 years, resulting in the following changes since the CD-RAP has been in effect:

- Benzo(g,h,i,)perylene is not currently considered by EPA to be a carcinogen, although it is identified as such in the CD-RAP

- Carbazole and quinoline are currently considered carcinogens, although they were identified as "other PAH" (non-carcinogens) in the CD-RAP (the CD-RAP did identify quinoline as a carcinogen, but only in the presence of at least one other listed carcinogen)

The attached risk assessment report reviews the historical groundwater monitoring database for the Drift, Platteville, and St. Peter Aquifers, and assesses the hypothetical risks assuming drinking water exposure. Hypothetical risks are determined two ways:

- Based on the ground rules established in the CD-RAP
- Based on the current state of toxicological knowledge

The inclusion of carbazole and quinoline as carcinogens results in relatively greater hypothetical carcinogenic risks calculated for the various monitor wells, because these two compounds are commonly found in the samples. Benzo(g,h,i)perylene is typically found at very low concentrations, and does not impact the hypothetical risk calculations greatly. As explained in the risk report, the maximum concentration of each chemical detected in each given year was used to calculate risk, regardless of the number of samples that were collected during the year. Therefore, the hypothetical risks represent the sum of all of the highest risks that could be attributed to a particular well in a given year. This is a very conservative approach.

Figures 1 through 6 provide a visual summary of the hypothetical risk assessment results. The color scheme identifies the years when samples were taken, and when various hypothetical risks exceeded acceptable risk benchmarks for cancer and non-cancer risk. Figures 1 and 2 depict monitor wells in the Drift Aquifer. Figure 1 is based on the CD-RAP definition of carcinogens, and Figure 2 is based on current science. Similarly, Figures 3 and 4 depict the Platteville Aquifer, and Figures 5 and 6 depict the St. Peter Aquifer. In general, the hypothetical risks greater than the acceptable risk benchmarks for all three aquifers are limited to a few wells located close to the Reilly Site. These few wells are identified in Table 2 (for wells that exceeded a hazard index of 1) and Table 3 (for wells that exceeded 1×10^{-5} carcinogenic risk). Figures 3 and 4 show that well W434 exceeded the hazard index in 1992, but there have been four subsequent years with acceptable levels of hypothetical risks. Well W101 exceeded hypothetical cancer risks in 1999 based on the concentration of quinoline. This is the first time well W101 has exceeded any of the hypothetical risk values, although the total PAH in this well has always been unusually high.

In summary, review of the Reilly Site database indicates that hypothetical risks are low in the vicinity of wells W422 and W434. The numeric cessation concentrations in Table 1 should be used to evaluate gradient control operations, because the water is not used for drinking, thus there is no completed exposure pathway.

Compliance with Gradient Control Objectives: This section discusses the hydraulic impacts of pumping wells W422 and W434 and evaluates the groundwater quality in the affected aquifers. Well W422 was identified in the CD-RAP as the Drift-Platteville Aquifer gradient control well, and pumping began at well W422 in October 1987. Pumping has generally been maintained at approximately 55 gallons per minute, although well W422 has been increased on two occasions (May 1991 and January 1992) to try to expand the area of influence of the well into larger portions of the Northern Area. The capture area

of well W422 and the other source and gradient control wells is shown in Figure 7, along with the location of the buried bedrock valley.

Drift Aquifer monitor wells within the well W422 capture zone include wells P109, P112, P307, P309, P310, P311, W10, W11, and W12, for which, historical water quality monitoring data exist. Wells P2, P20, P42, P64, and W16 are also within the well W422 capture zone, but have not been sampled for PAH under the CD-RAP. Of the wells that have been sampled, only well W10 has exceeded acceptable risks (hypothetical carcinogenic risk in 1992), although the most recent sampling in 1994 showed acceptable risks at well W10. The lack of hypothetical risks in the upgradient groundwater means that well W422 is not needed to prevent unacceptable levels of PAH from migrating into the buried bedrock valley near Wooddale Blvd. (Figure 7). Drift Aquifer groundwater exceeding acceptable risks is also not found downgradient from well W422.

Well W434 is completed in a relatively low permeability portion of the Platteville Aquifer, and has a very small capture area, as predicted from the pump test performed when this well was installed in May 1991. As a result, the only monitor well that is located in the capture zone of well W434 is well W120, approximately 30 feet away. Other Platteville Aquifer monitor wells in the general vicinity of well W434 include W432 and W433. None of these wells have ever exceeded acceptable risk levels. Based on the hydraulic characteristics of well W434, and on the dwindling levels of PAH in samples from well W434, it appears that this well has a very limited benefit intercepting PAH, thus protecting the buried bedrock valley.

The role of the bedrock valley in allowing PAH to migrate from shallower aquifers into the St. Peter Aquifer has never been quantified, however, there may not be a significant pathway for such migration. This conclusion is supported by a review of water levels and water quality data in the Drift, Platteville and St. Peter Aquifers in the vicinity of the buried bedrock valley. Water level differences between the Drift and Platteville Aquifer are typically within one to two feet in the vicinity of the Reilly Site. By contrast, the water levels in the St. Peter Aquifer are typically 12 to 15 feet lower than the Drift or Platteville Aquifer water levels. If significant leakage were occurring through the bedrock valley, then the water levels in the Drift and Platteville Aquifers should be lower, and the water levels in the St. Peter Aquifer should be higher. The difference in water levels should be less in the vicinity of the bedrock valley. Instead, the well cluster comprised of wells W133, W101 and W117 shows the normal head difference between the aquifers.

Tables 5-1, 6-1 and 6-2 of the Annual Monitoring Report for 1999 contain water quality data that indicate that PAH are not migrating through the bedrock valley. Total PAH concentrations in wells W133 and W412 are in the hundreds of parts per trillion range, and have decreased over the monitoring period from 1988 to the present. The higher concentrations of PAH in nearby Drift and Platteville Aquifer wells (e.g., well W120 at approximately 3,000 parts per trillion in 1999 and well W101 at approximately 30,000 parts per trillion) do not appear to be moving through the bedrock valley and affecting the quality of the water in the St. Peter Aquifer.

The gradient control objective of limiting the spread of contamination into the area delineated by the buried bedrock valley has been met, and continued operation of these wells no longer provides any benefit to meet that objective. Subsequent to the CD-RAP agreement, the St. Peter Aquifer RI/FS was completed, and a gradient control remedy has been implemented. Well W410 pumps at a minimum rate of 50 gallons per minute, and has been shown to capture groundwater in a large portion of the St. Peter Aquifer, including water in the vicinity of the bedrock valley (Figure 7). If PAH did migrate through the bedrock valley, the PAH would be contained by pumping in the St. Peter Aquifer.

Assessment of Contaminant Spreading: Future monitoring to assess if PAH are migrating toward and into the bedrock valley will consist of a network of Drift, Platteville, and St. Peter Aquifer wells to replace the wells that are currently monitored for the 2000 Sampling Plan. Table 4 is the proposed list of wells to monitor post-cessation water quality. These wells will track PAH concentrations in the Drift and Platteville Aquifers downgradient from the Reilly Site, between the Reilly Site and the bedrock valley. Because PAH have been found to move relatively slowly at the Reilly Site, annual monitoring of the wells shown in Table 4 is proposed. St. Peter Aquifer wells W433 and W412, that would reflect impact from leakage through the bedrock valley, are also included in the monitoring network. The groundwater samples from this monitoring network will be analyzed for PAH to determine if concentrations exceed the criteria to resume gradient control discussed below.

Criteria to Resume Gradient Control: Wells W422 and/or W434 will resume pumping if necessary to prevent PAH from spreading into the bedrock valley. Such a decision will be based on the results of water quality monitoring that shows unacceptable levels of PAH migrating toward and into the bedrock valley. Because of the relatively slow movement of PAH in groundwater, as demonstrated by the historical analytical results for the Reilly Site, resumption of pumping should not need to be required on an emergency basis. Rather, annual monitoring data can be gathered, assessed and reported to the Agencies, and a decision to resume pumping can be made at that time. Data assessment should be based on the actual or potential risks posed by the specific compounds detected in the samples based on the best current scientific knowledge.

For the purpose of providing numeric criteria as a starting point for allowing cessation of pumping to take place, the City proposes to use the same cessation criteria described above as "resumption" criteria.

The City recommends that wells W422 and W434 be placed on stand-by status, wherein they will be included in the City's routine maintenance program, and the well houses will continue to be supplied with electricity. The existing pumps will remain in the wells and will be used for the annual sampling events. Sewer connections will be maintained. No extraordinary measures will be required to return these wells to active service, if needed.

The City asks that the Agencies approve this cessation request because the water quality in the wells meets the proposed numeric cessation criteria, and the hypothetical risks posed by the PAH in groundwater are acceptable. Most importantly, the objective

of the gradient control system has been met, and will continue to be met after cessation of pumping.

The City is looking forward to discussing this request with the Agencies and would gladly meet for that purpose. The enclosed risk assessment document provides a fresh perspective on the historical data that have been gathered since 1988. The City desires reaching a mutual understanding of the implications of the changes in the toxicological sciences since the signing of the CD-RAP in 1986. Please contact this office if you have any questions regarding this submittal.

Sincerely,

William M. Gregg
Project Leader for the
City of St. Louis Park

Enclosures

cc: Scott Anderson
Mike Rardin
Carl Herbrandson

TABLE 1

PROPOSED CESSATION CRITERIA FOR WELLS W422 AND W434

Compound	EPA MCL[1] (ppb)	MDH HRLs[2] (ppb)	Proposed Cessation Criteria (ppb)	Well W422 (ppb)[3]	Well W434 (ppb)[3]
cPAH:					
Benzo(a)pyrene	0.2	-	0.2	ND[4]	ND
Other PAH:					
Acenapthene	-	400	400	13	0.07
Anthracene	-	2,000	2,000	ND	ND
Fluoranthene	-	300	300	10	ND
Fluorene	-	300	300	ND	ND
Naphthalene	-	300	300	15	ND
Pyrene	-	200	200	ND	ND

[1] Benzo(a)pyrene is the only carcinogenic PAH listed by the EPA and MDH to have a MCL. The MCL for Benzo(a)pyrene is 0.2 ppb.

[2] Based on MDH HRLs, these six compounds, listed above, are the only "Other PAH" listed by the MDH's HRLs for groundwater. The only EPA reference for Other PAH is 400 ppb Health Advisory for naphthalene.

[3] Concentrations shown are the highest levels of these compounds detected in any sample since monitoring began in 1988.

[4] Compound has never been detected. Detection limits have varied, but have always been 10 ppb or less.

TABLE 4

IDENTIFICATION OF DRIFT, PLATTEVILLE AND ST. PETER AQUIFER WELLS FOR ANNUAL MONITORING

Drift Aquifer Wells

- P109
- P112
- P312
- P313
- W117
- W422
- W427

Platteville Aquifer Wells

- W101
- W143
- W428
- W431
- W434
- W438

St. Peter Aquifer Wells

- SLP3
- W133
- W408
- W410
- W412